Tg (DSC) of cast PU resin based on 4 different polyols with different amounts of glycerin

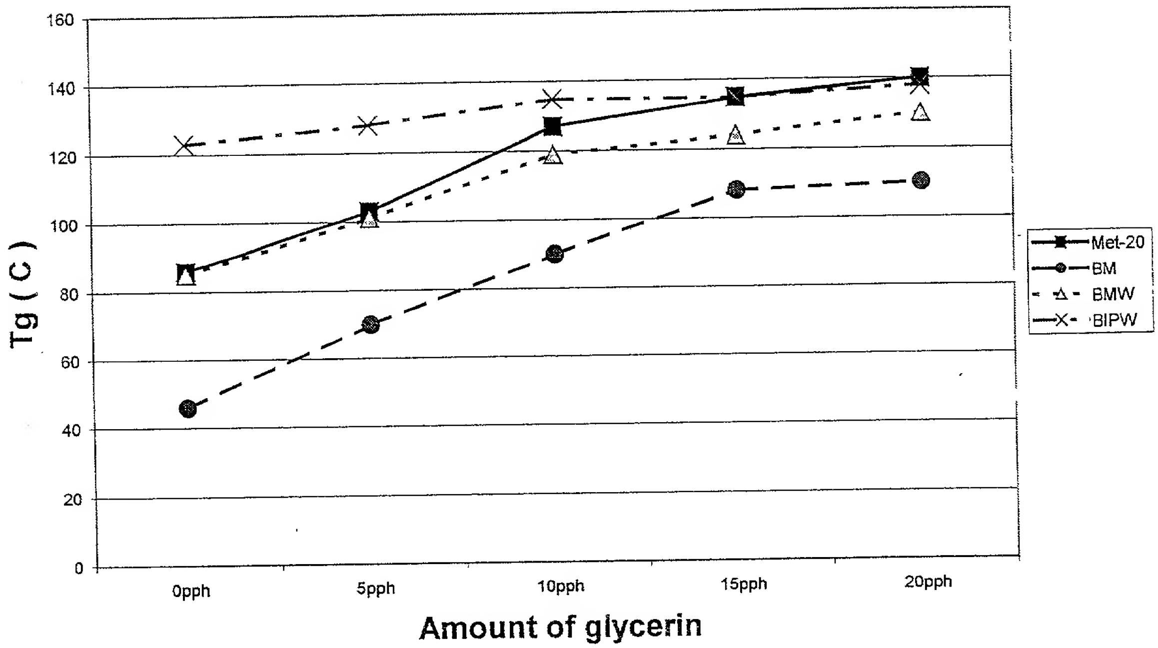

FIG. 1

Flexural modulus of cast PU resin based on 4 different polyols with different amounts of glycerin

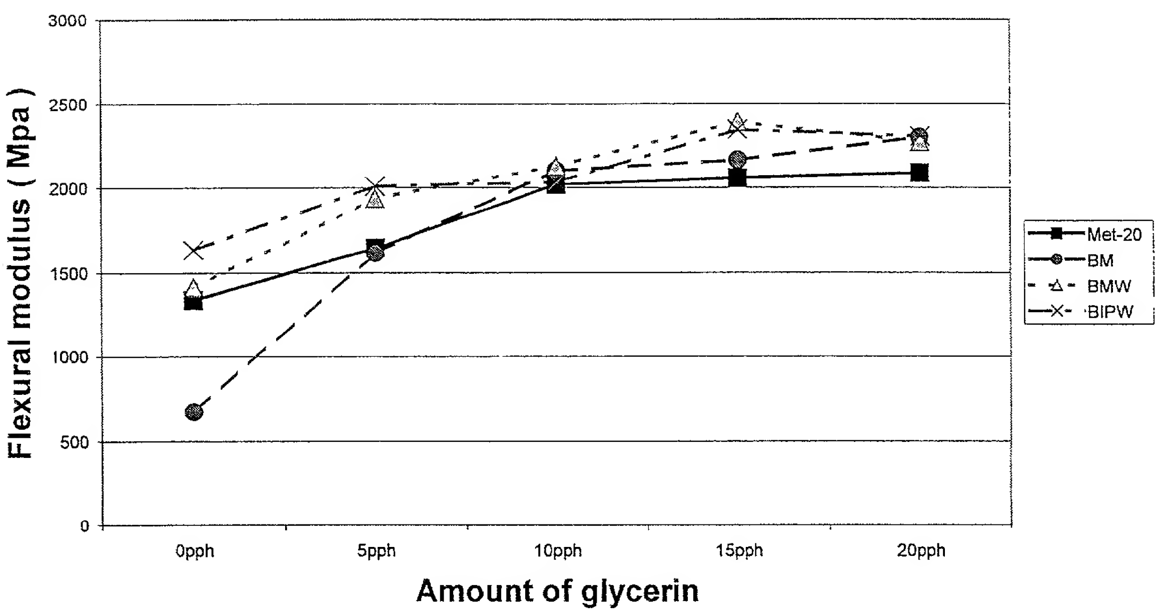

FIG. 2

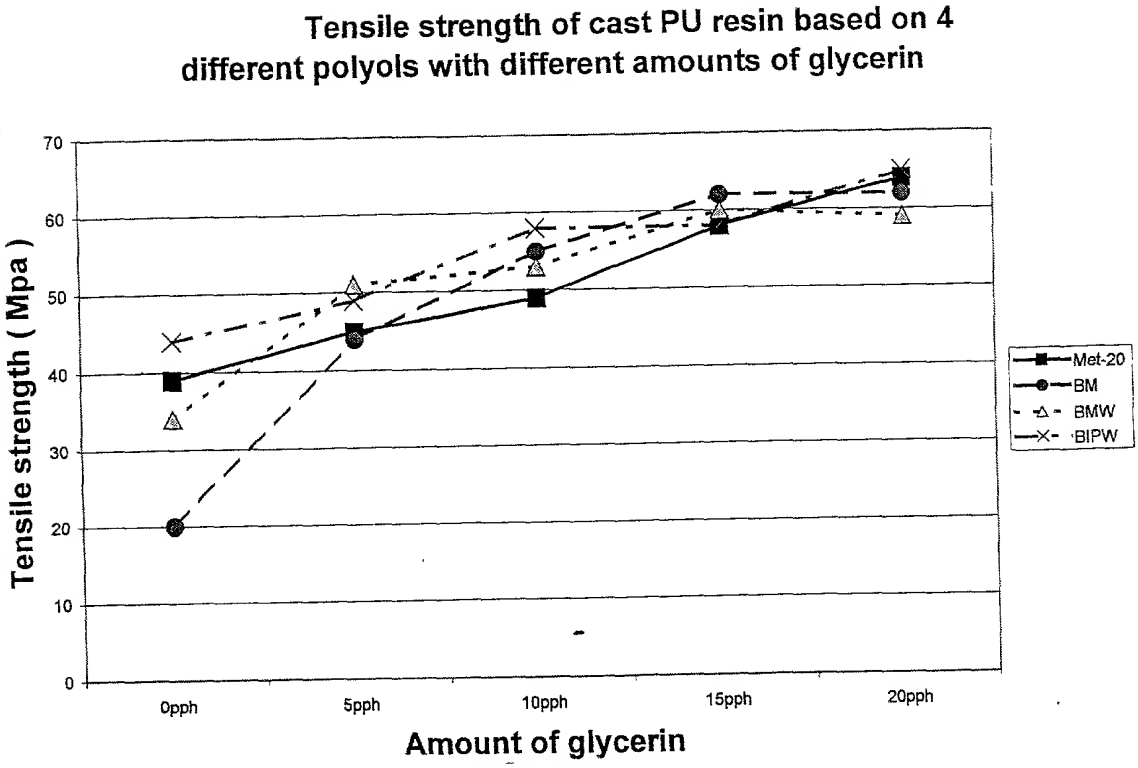

FIG. 3

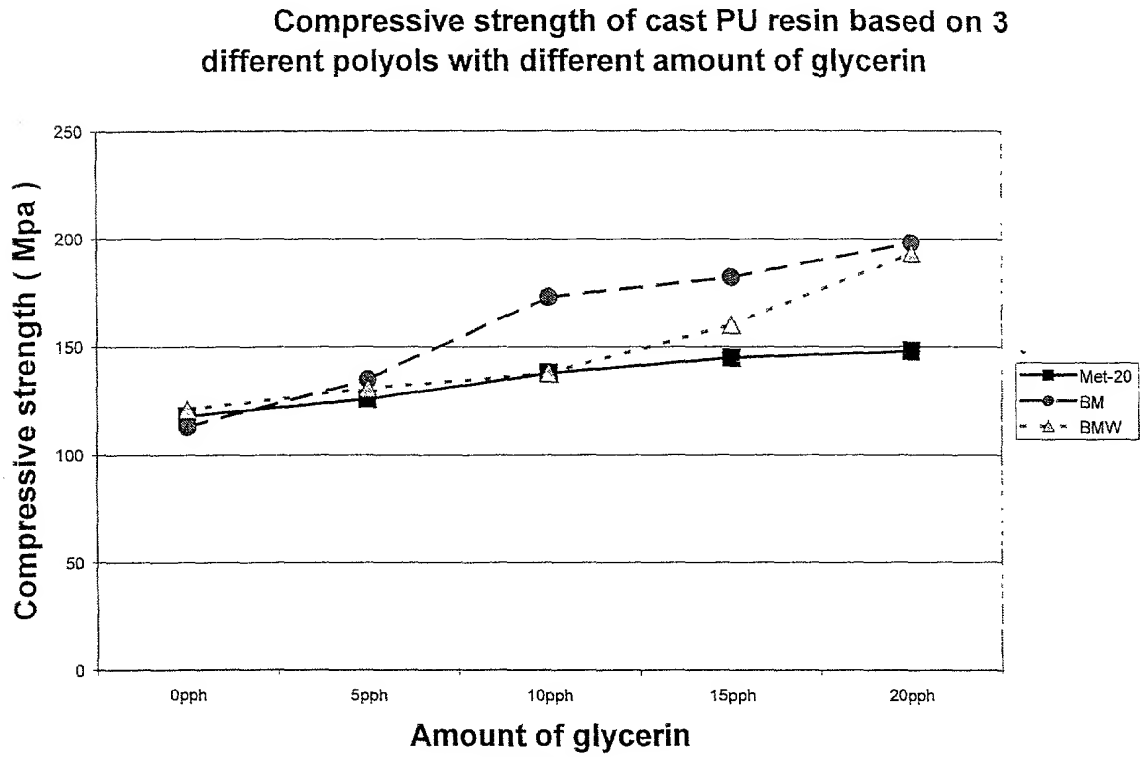

FIG. 4

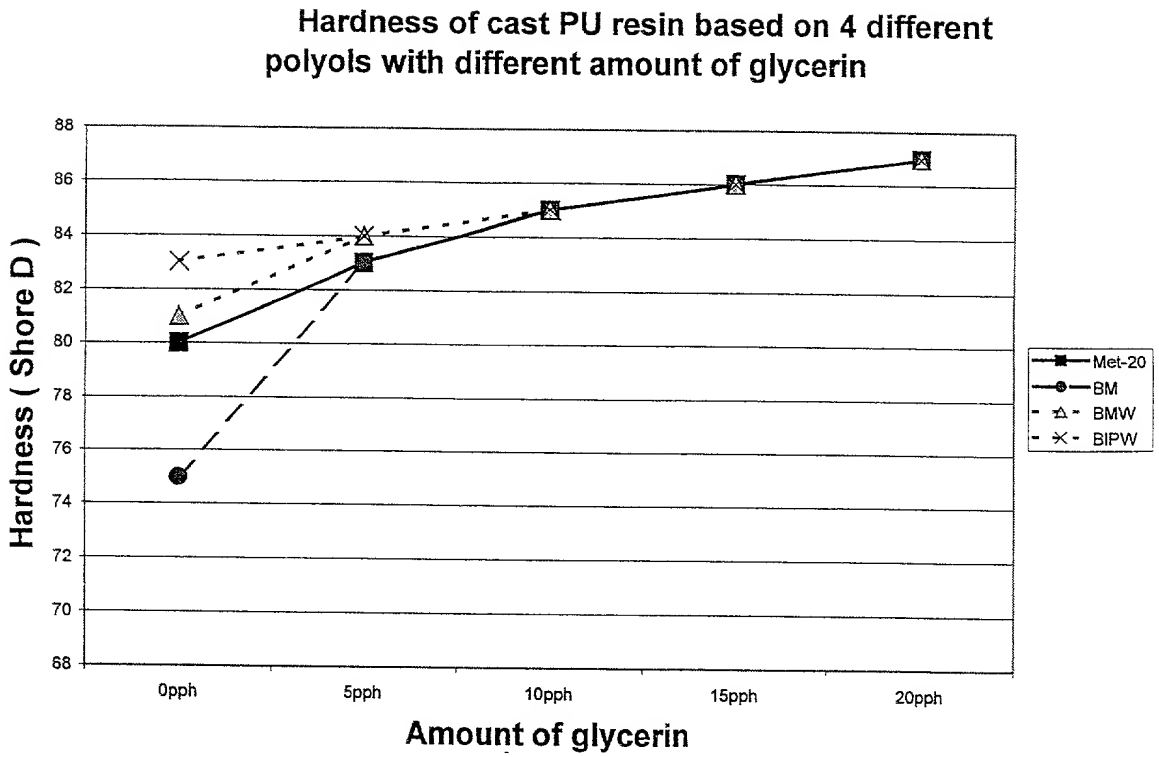
Hardness of cast PU resin based on 4 different polyols with different amount of glycerin
Hardness (Shore D)
88
86
84
82
80
78
76
74
72
70
68
0pph
5pph
10pph
15pph
20pph
Amount of glycerin
Met-20
BM
BMW
BIPW

FIG. 5

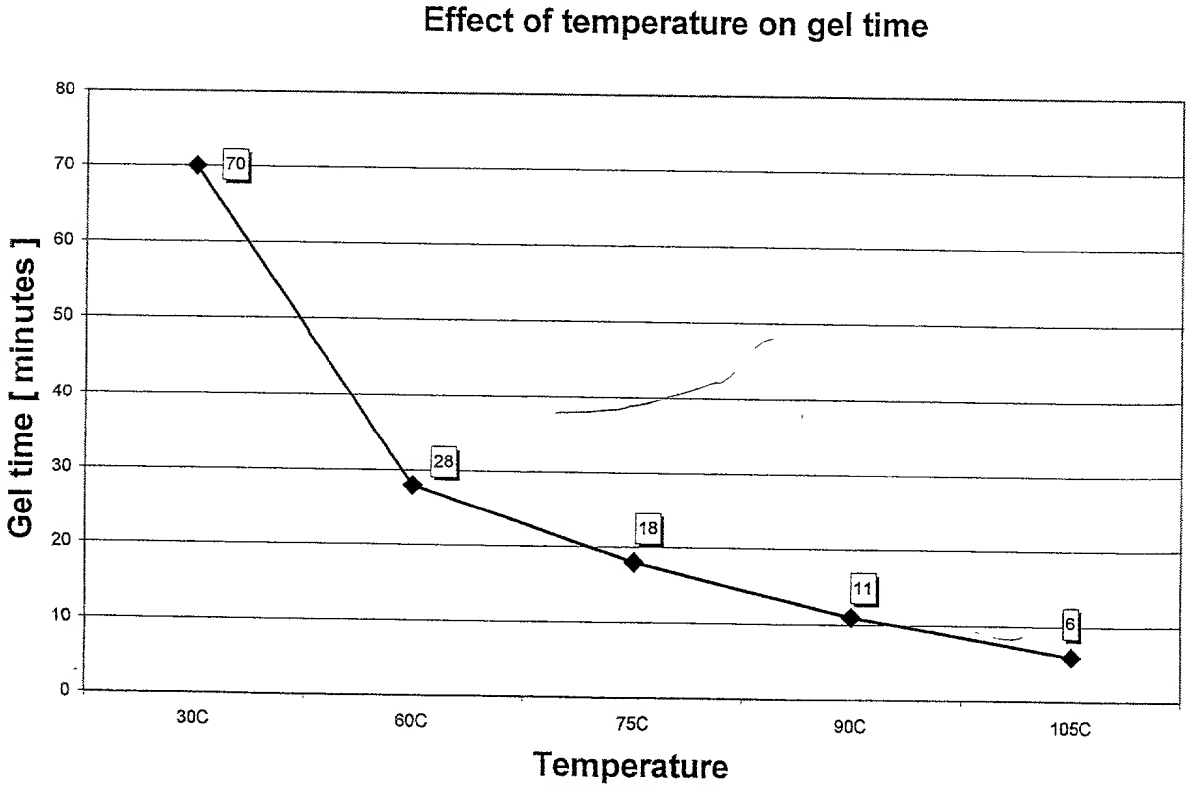
Effect of temperature on gel time
Gel time [minutes]
80
70
60
50
40
30
20
10
0
70
28
18
11
6
30C
60C
75C
90C
105C
Temperature

FIG. 6

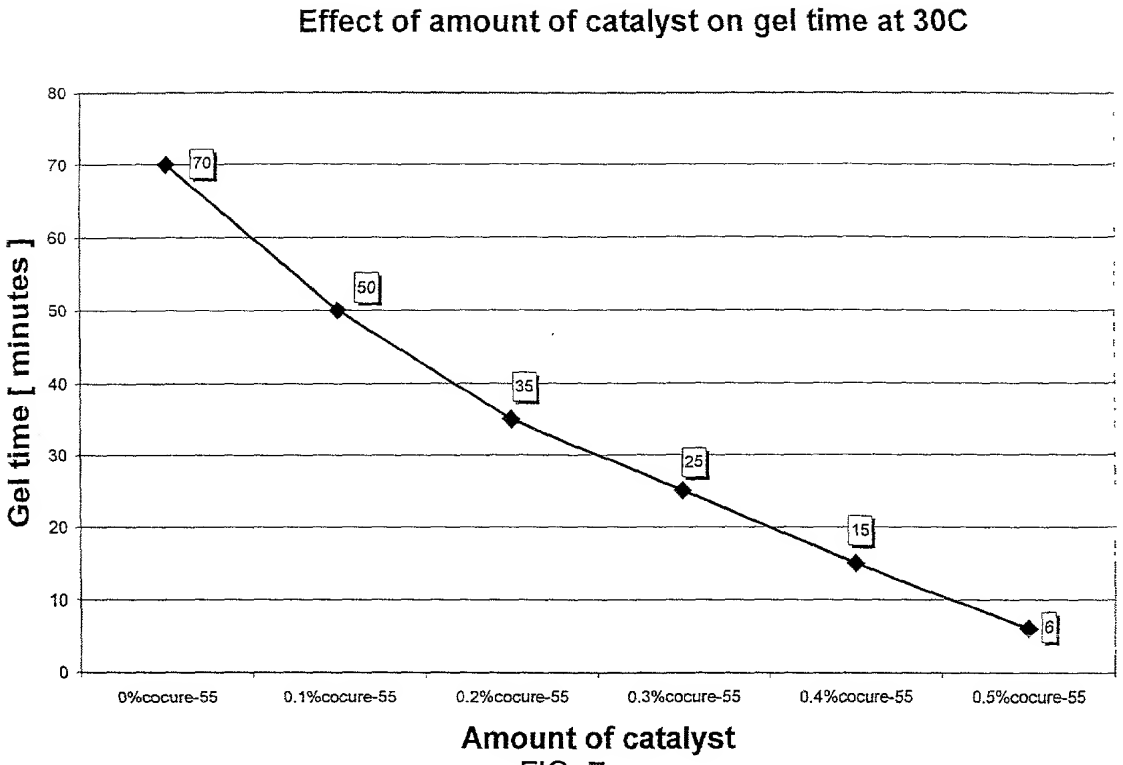
Effect of amount of catalyst on gel time at 30C
Gel time [minutes]
80
70
60
50
40
30
20
10
0
70
50
35
25
15
6
0%cocure-55
0.1%cocure-55
0.2%cocure-55
0.3%cocure-55
0.4%cocure-55
0.5%cocure-55
Amount of catalyst

FIG. 7

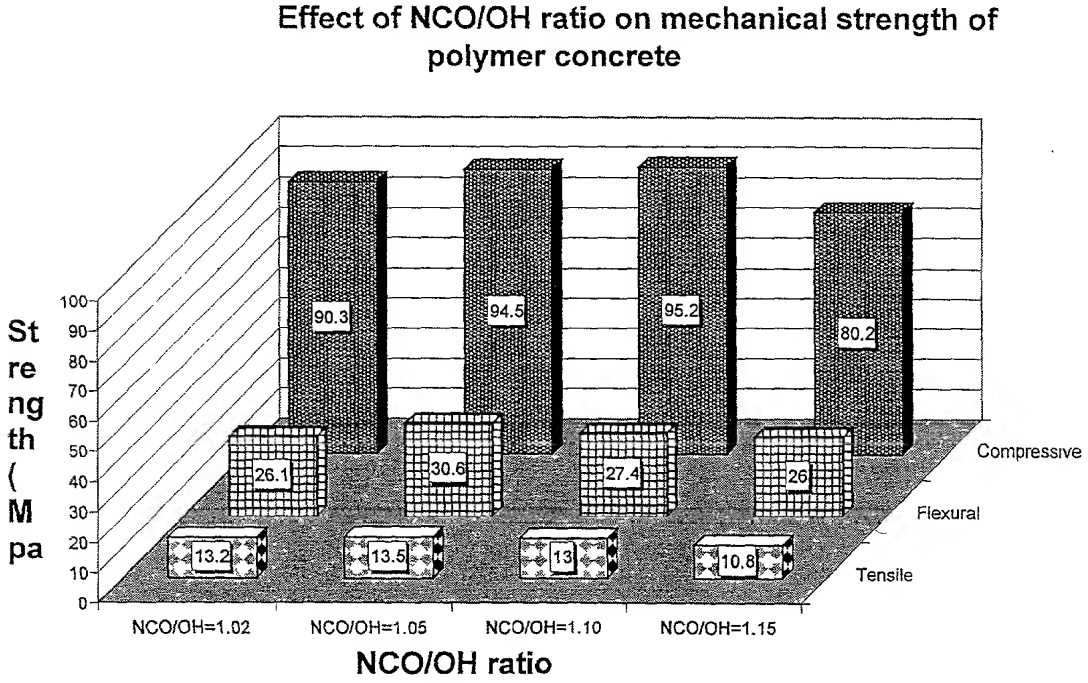
Effect of NCO/OH ratio on mechanical strength of polymer concrete
Strength (Mpa
100
90
80
70
60
50
40
30
20
10
0
90.3
94.5
95.2
80.2
26.1
30.6
27.4
26
13.2
13.5
13
10.8
Compressive
Flexural
Tensile
NCO/OH=1.02
NCO/OH=1.05
NCO/OH=1.10
NCO/OH=1.15
NCO/OH ratio

FIG. 8

Effect of resin amount on mechanical strength of polymer concrete

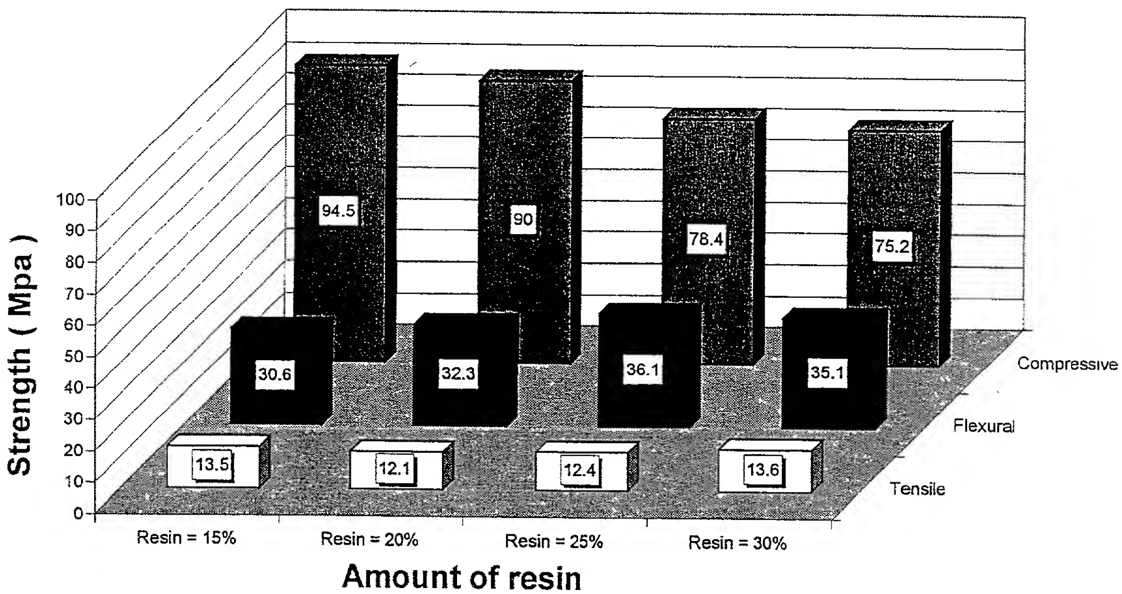

FIG. 9

Effect of amount of fine powder on mechanical strength of polymer concrete

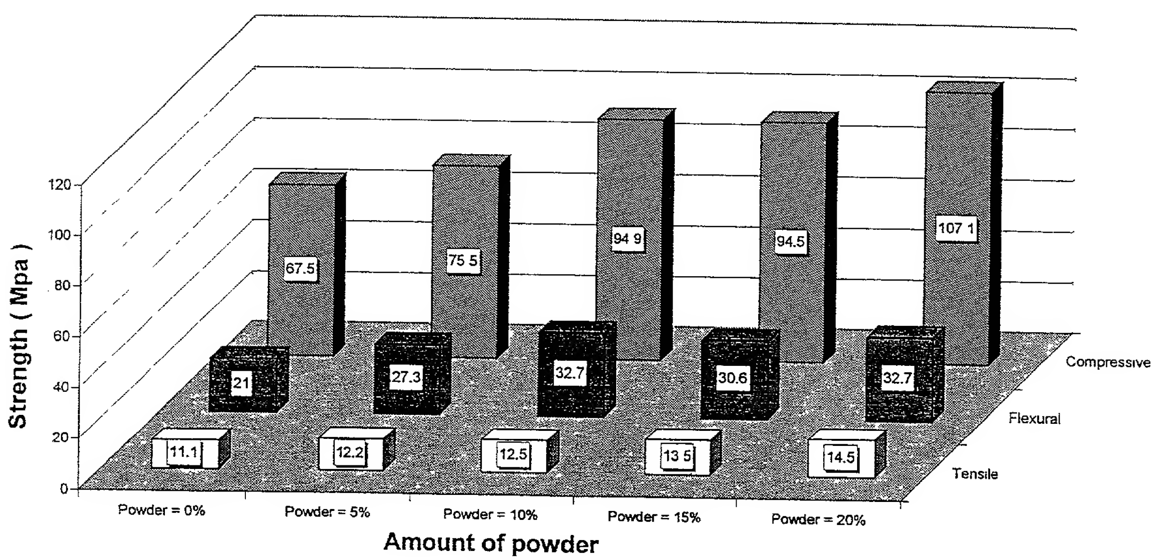

FIG. 10

Effect of amount of pea gravel on mechanical strength of polymer concrete

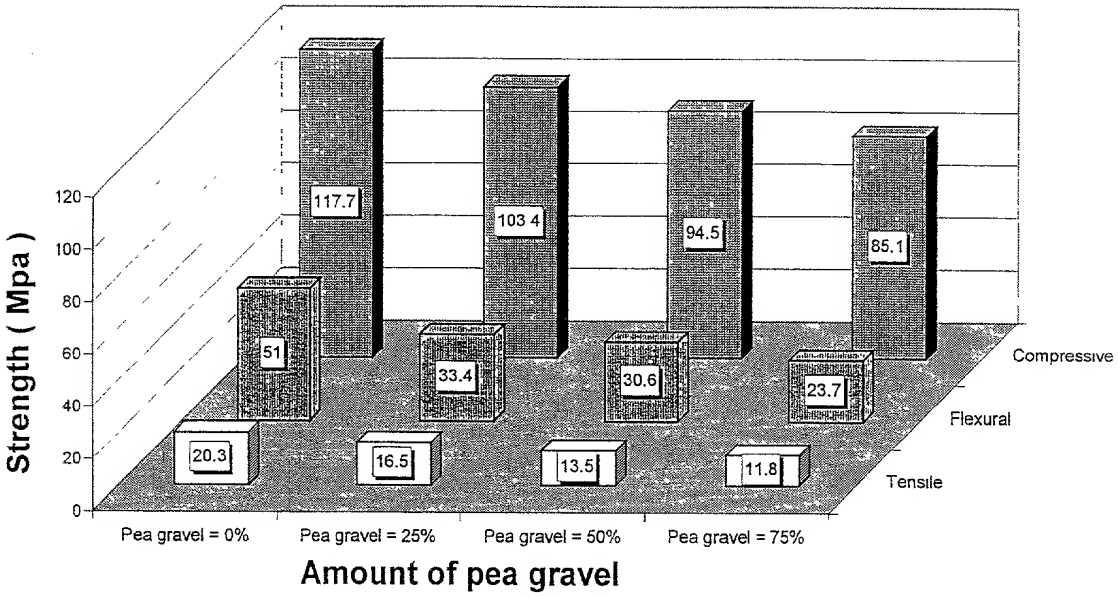

FIG. 11

Effect of sand type on mechanical strength of polymer concrete

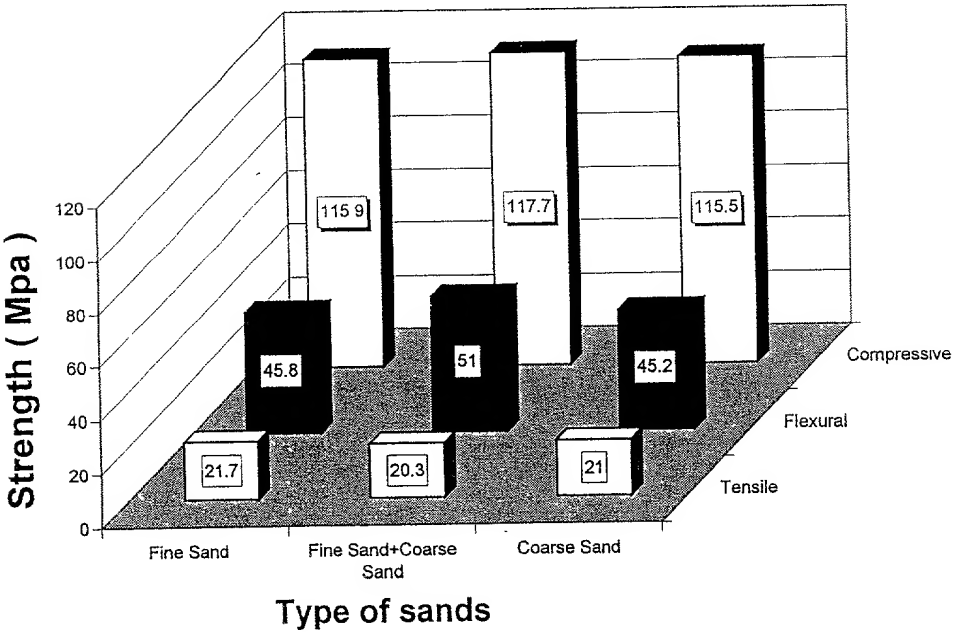

FIG. 12

Effect of amount of glycerin on mechanical strength of polymer concrete (with pea gravel)

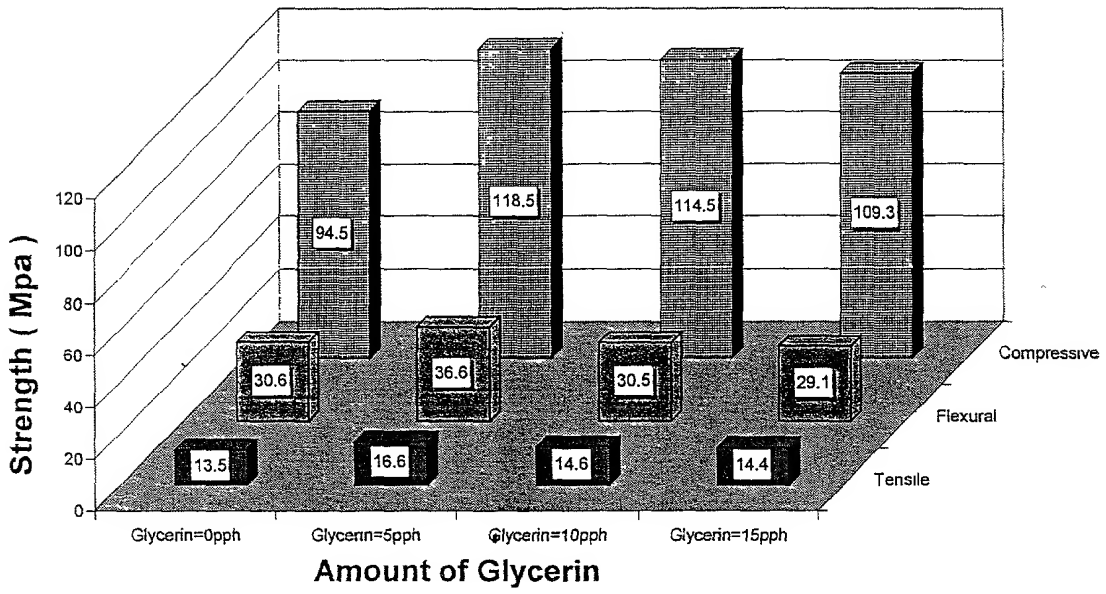

FIG. 13

Effect of amount of glycerin on mechanical strength of polymer concrete (without pea gravel)

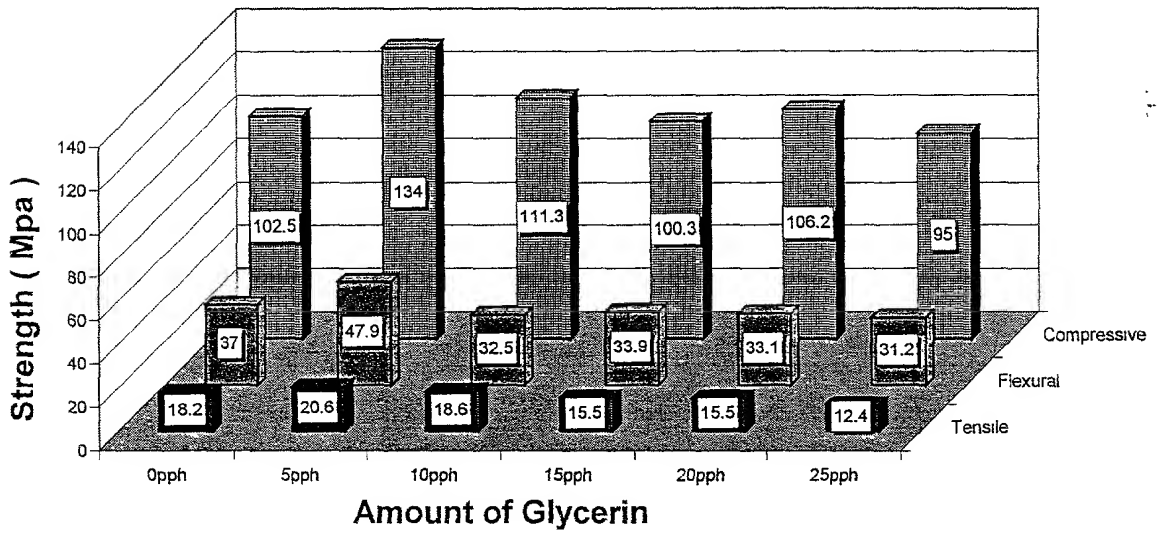

FIG. 14

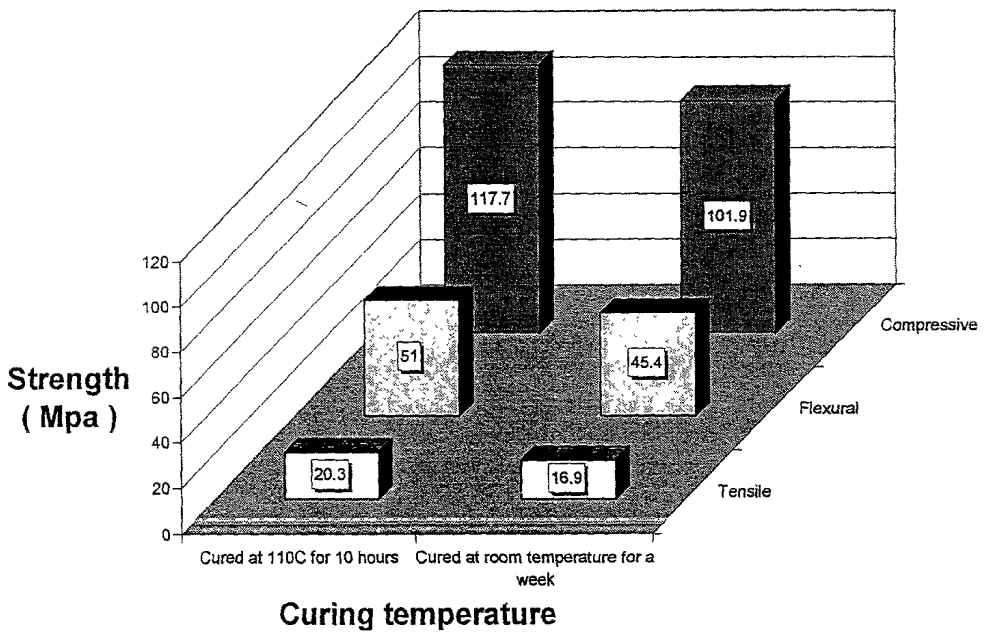

FIG. 15

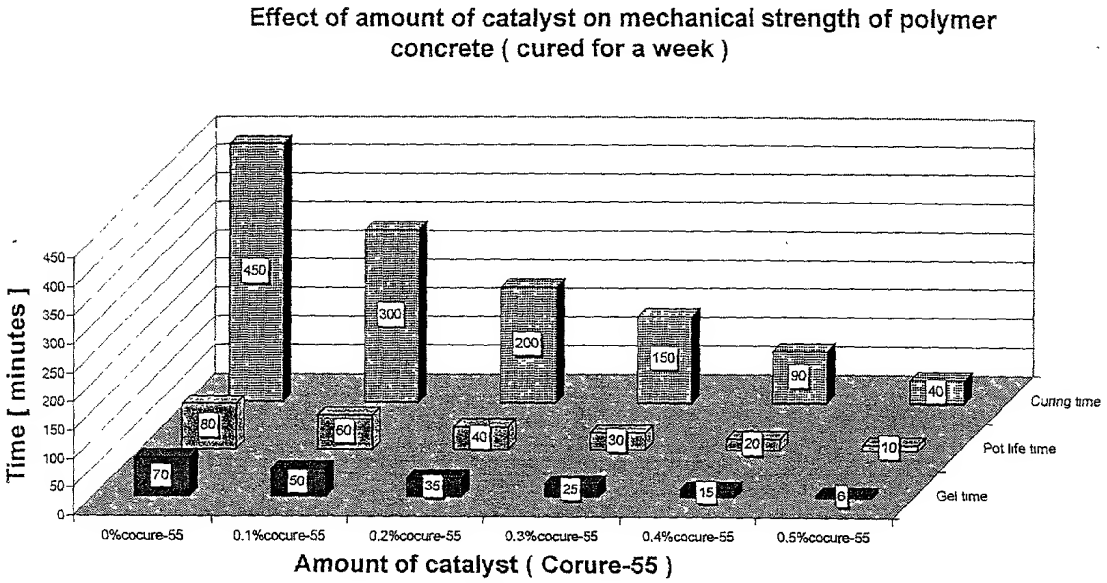

FIG. 16

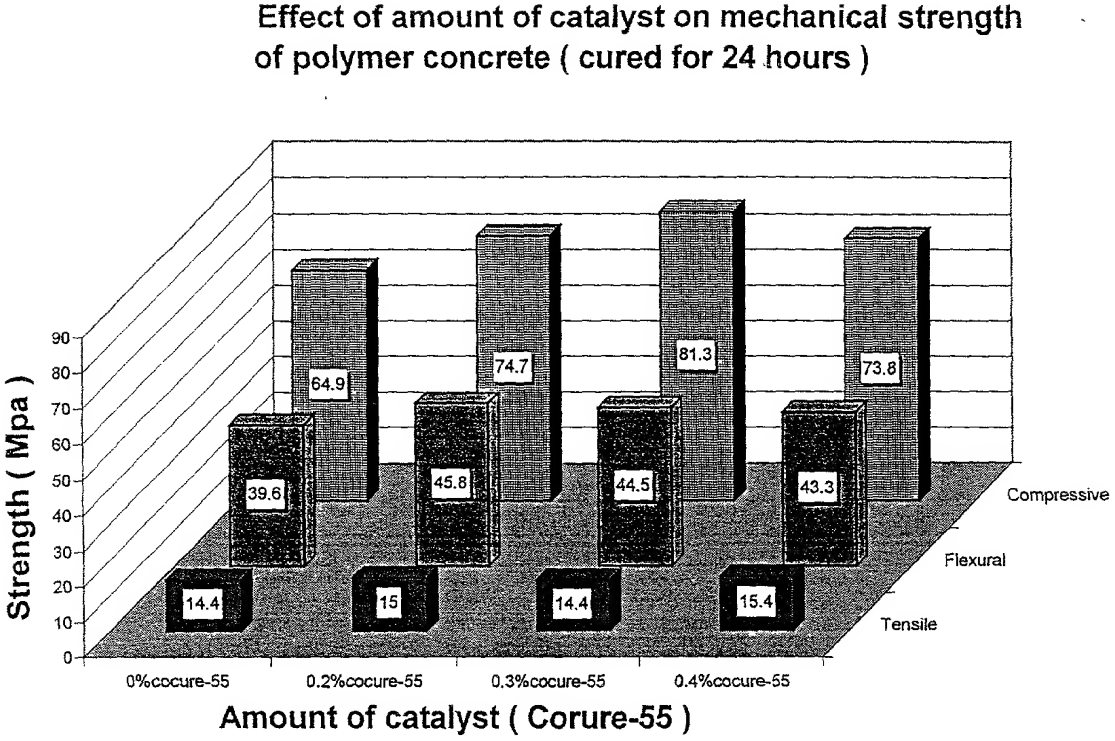
Effect of amount of catalyst on mechanical strength of polymer concrete (cured for 24 hours)
Strength (Mpa)
90
80
70
60
50
40
30
20
10
0
64.9
74.7
81.3
73.8
39.6
45.8
44.5
43.3
14.4
15
14.4
15.4
Compressive
Flexural
Tensile
0%cocure-55
0.2%cocure-55
0.3%cocure-55
0.4%cocure-55
Amount of catalyst (Corure-55)

FIG. 17

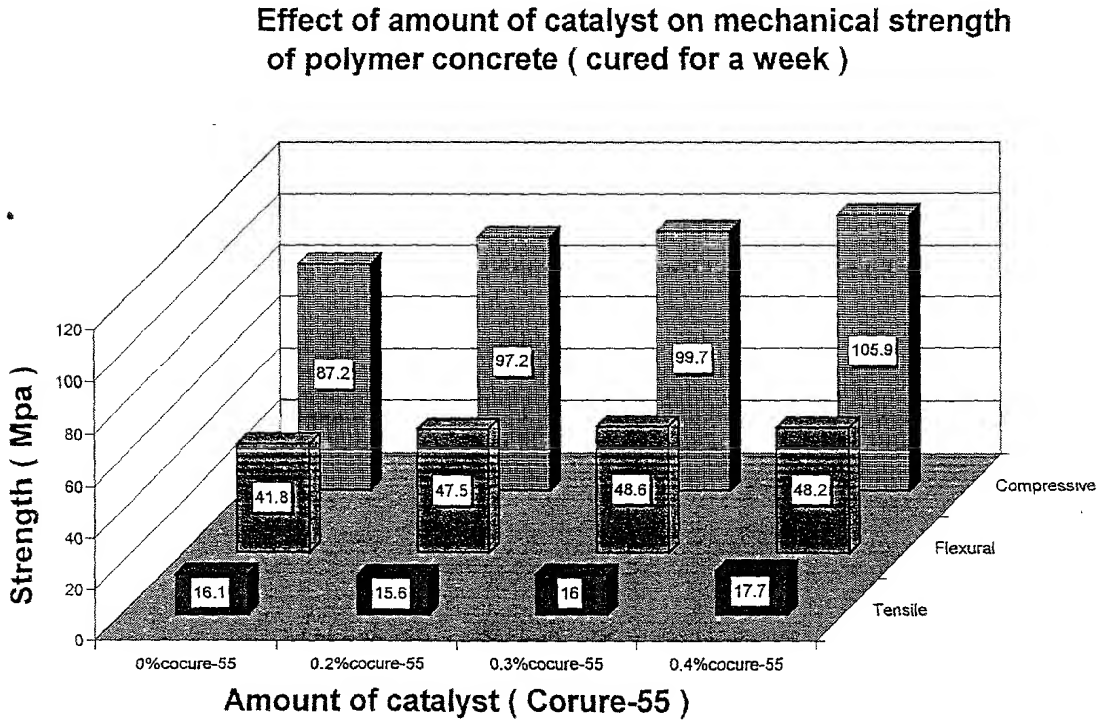
Effect of amount of catalyst on mechanical strength of polymer concrete (cured for a week)
Strength (Mpa)
120
100
80
60
40
20
0
87.2
97.2
99.7
105.9
41.8
47.5
48.6
48.2
16.1
15.6
16
17.7
Compressive
Flexural
Tensile
0%cocure-55
0.2%cocure-55
0.3%cocure-55
0.4%cocure-55
Amount of catalyst (Corure-55)

FIG. 18

Effect of catalyst on mechanical strength of polymer concrete
(room temperature cured for 2 weeks,)

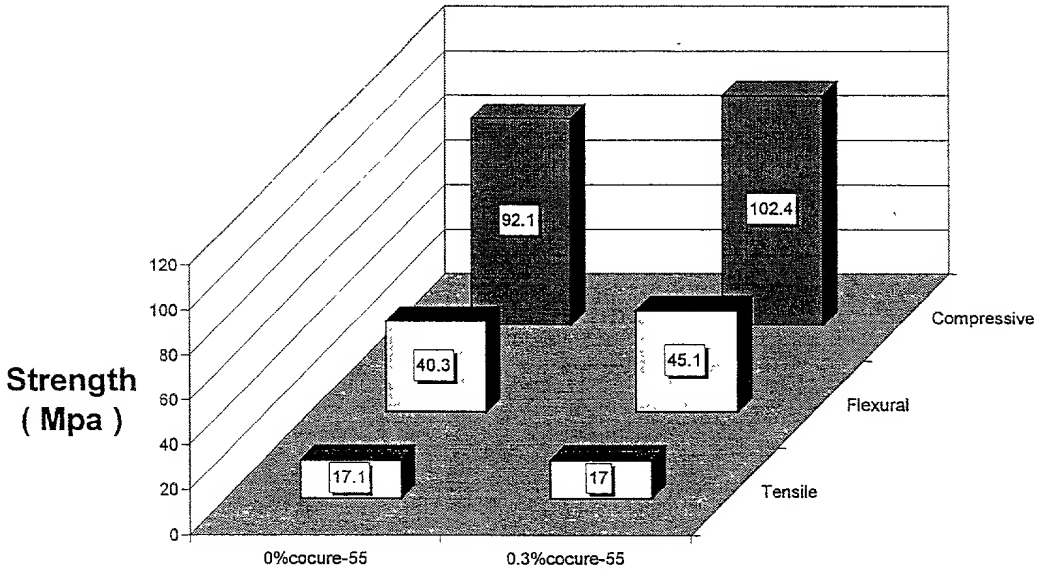

FIG. 19

Effect of catalyst on mechanical strength of polymer concrete
(room temperature cured for 1 month)

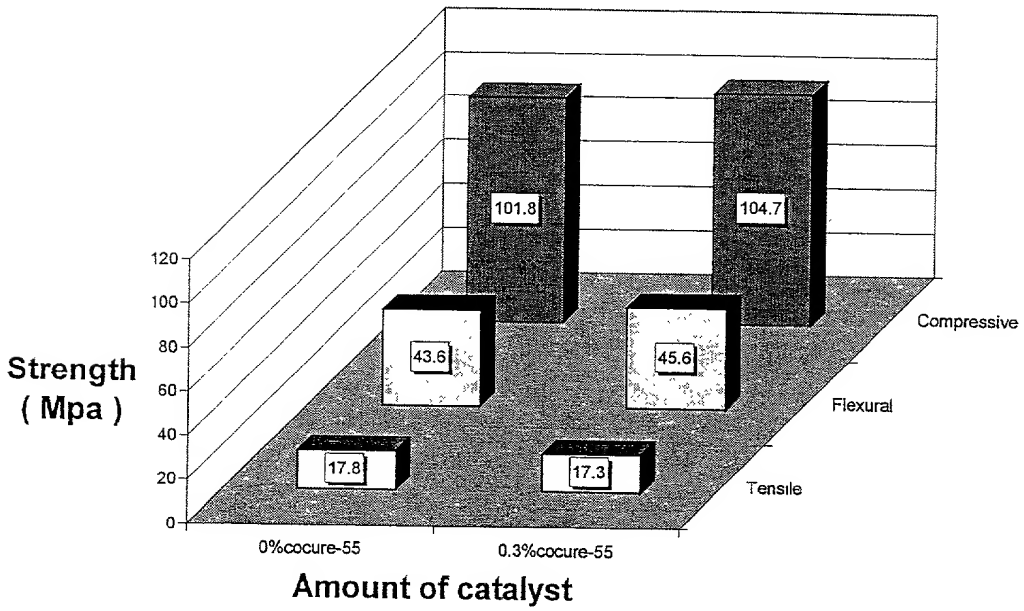

FIG. 20

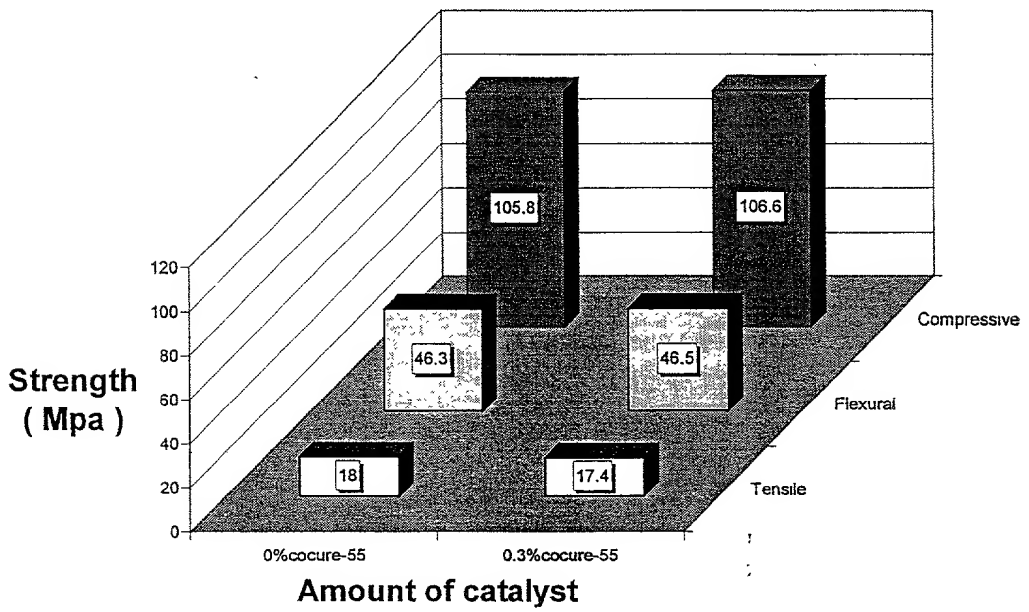
Effect of catalyst on mechanical strength of polymer concrete
(room temperature cured for 2 month)
Strength (Mpa)
120
100
80
60
40
20
0
105.8
106.6
46.3
46.5
18
17.4
Compressive
Flexural
Tensile
0%cocure-55
0.3%cocure-55
Amount of catalyst

FIG. 21

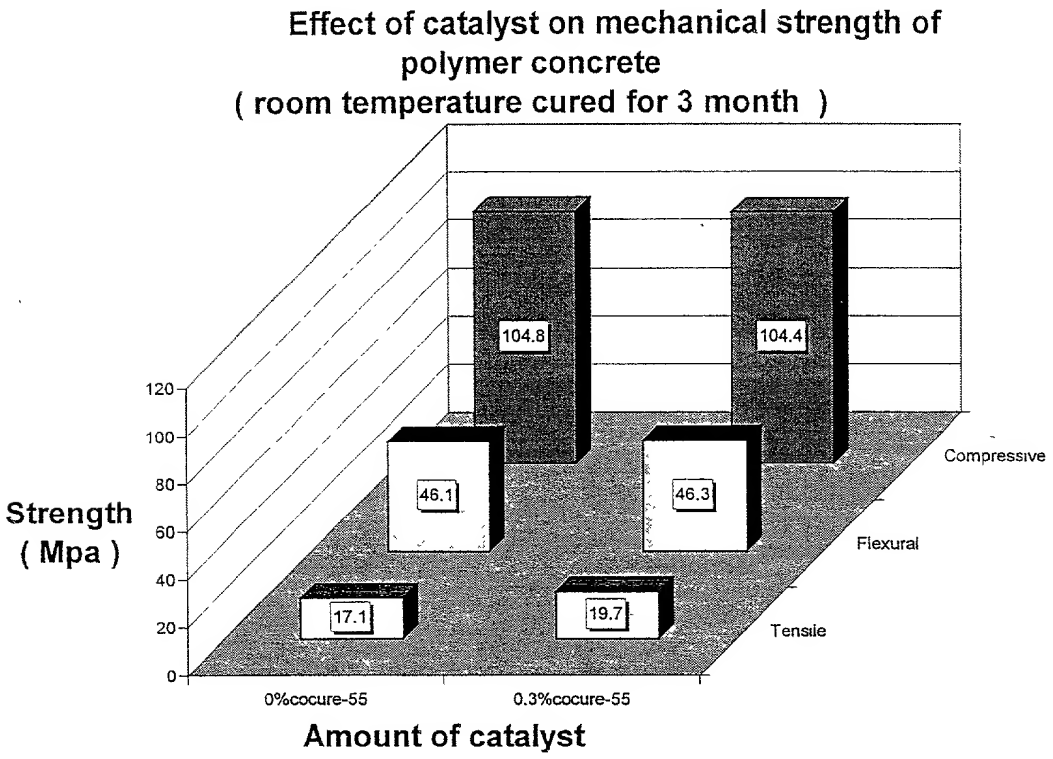
Effect of catalyst on mechanical strength of polymer concrete
(room temperature cured for 3 month)
Strength (Mpa)
120
100
80
60
40
20
0
104.8
104.4
46.1
46.3
17.1
19.7
Compressive
Flexural
Tensile
0%cocure-55
0.3%cocure-55
Amount of catalyst

FIG. 22

Effet of curing time on the mechanical properties of Soy-based PU concrete samples cured at room temperature without catalyst

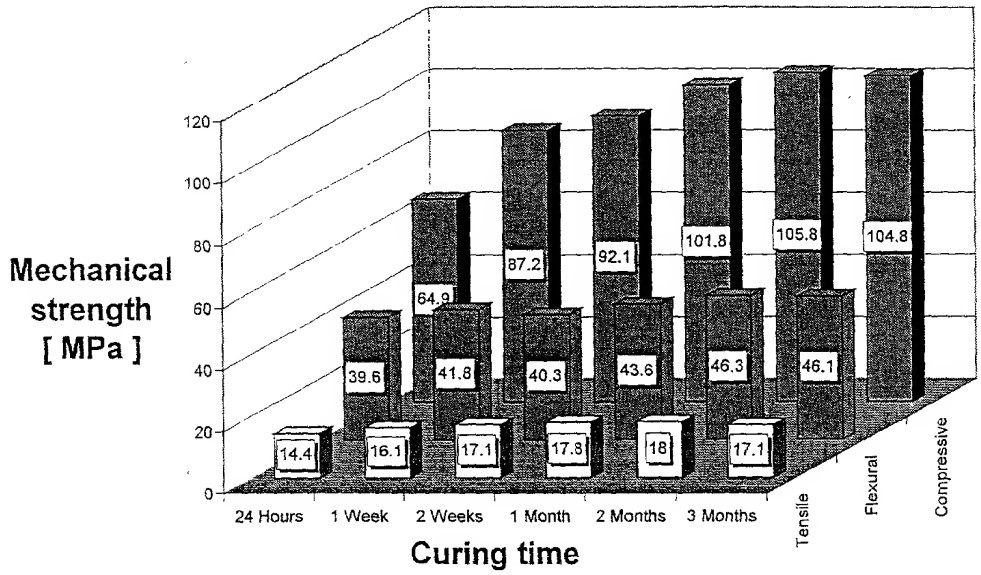

FIG. 23

Effet of curing time on the mechanical properties of Soy-based PU concrete samples cured at room temperature with 0.3% cocure 55 as a catalyst

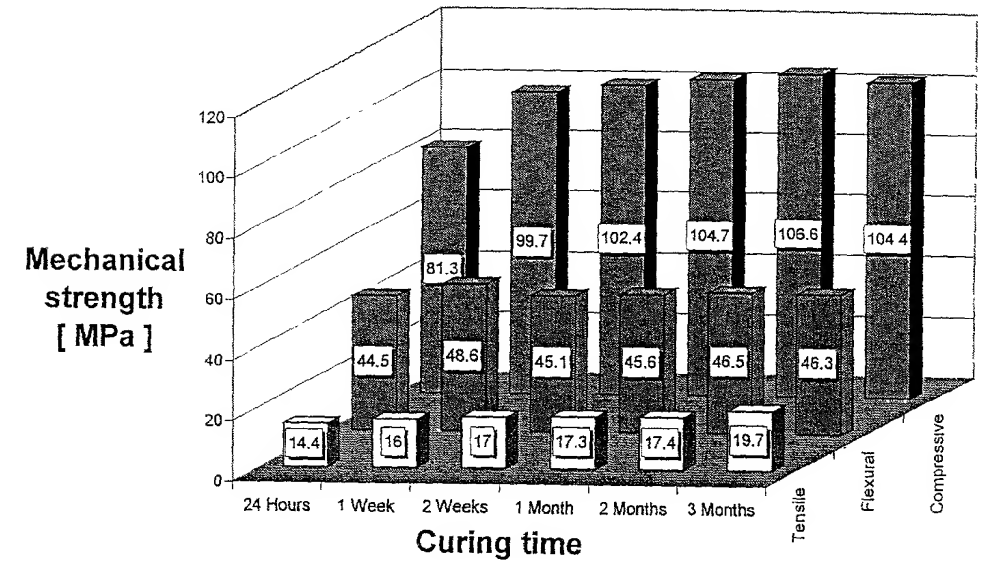

FIG. 24

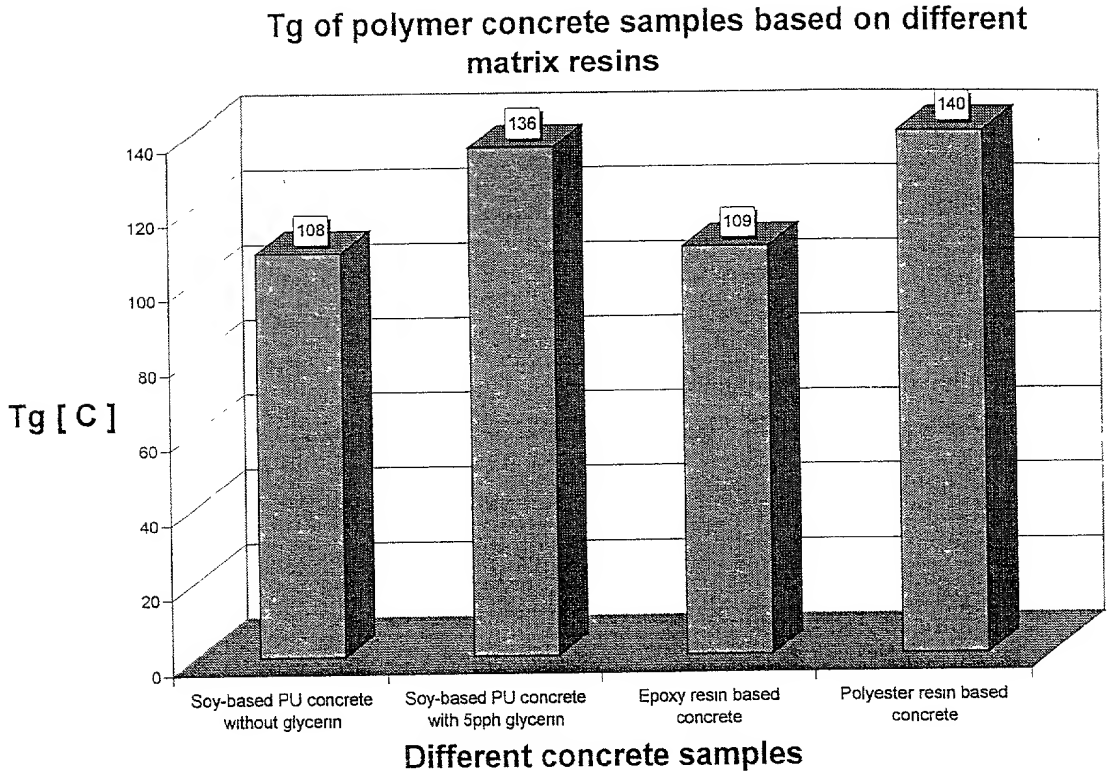

FIG. 25

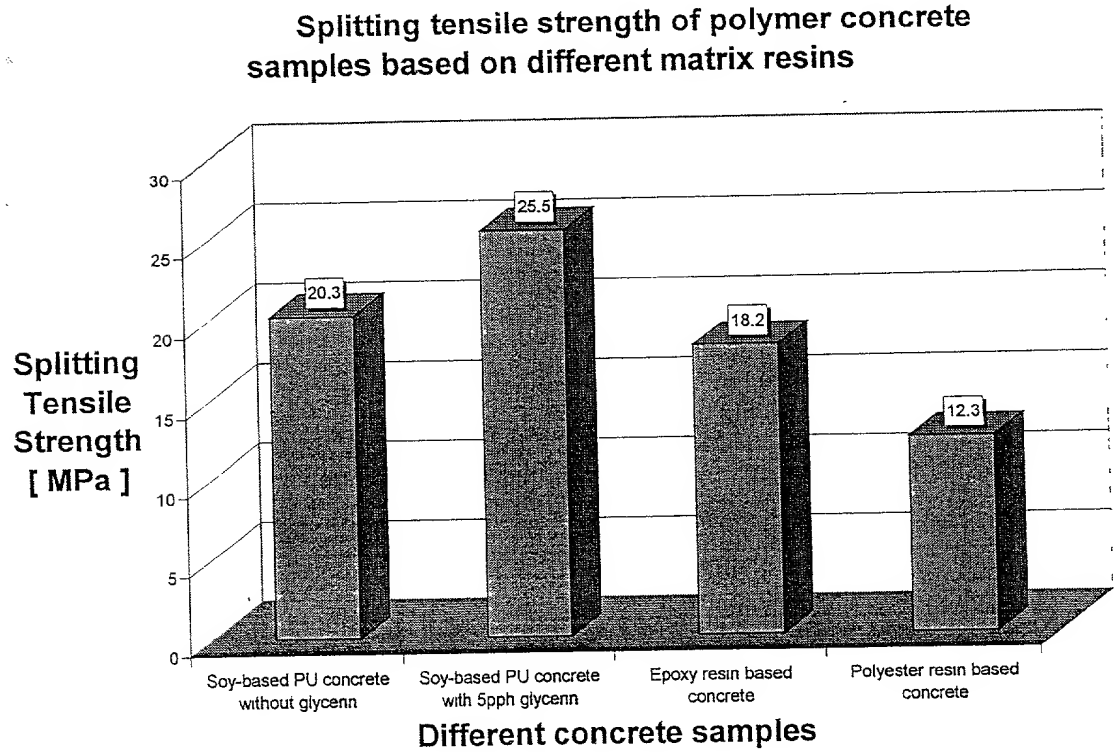

FIG. 26

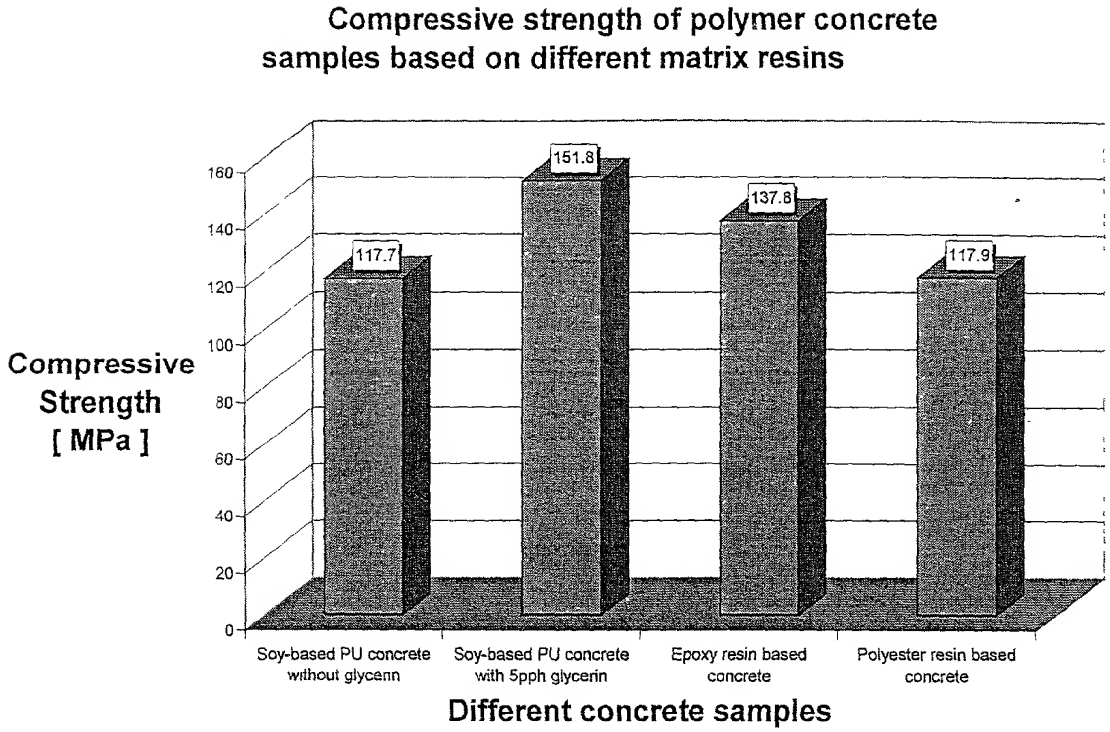

FIG. 27

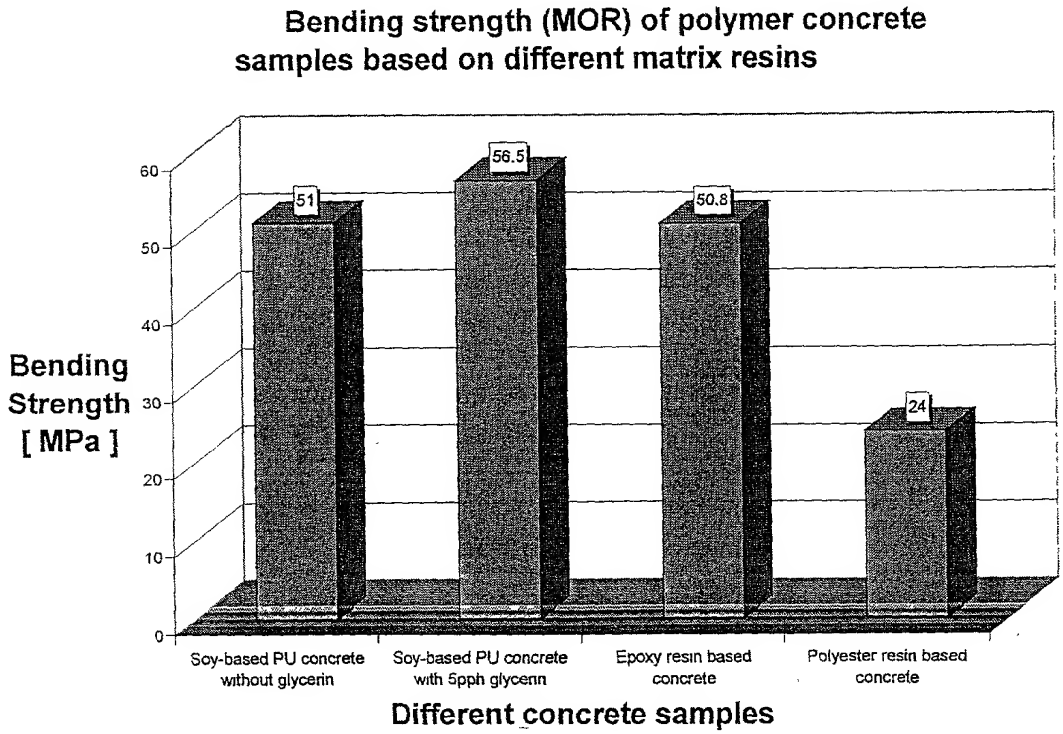

FIG. 28

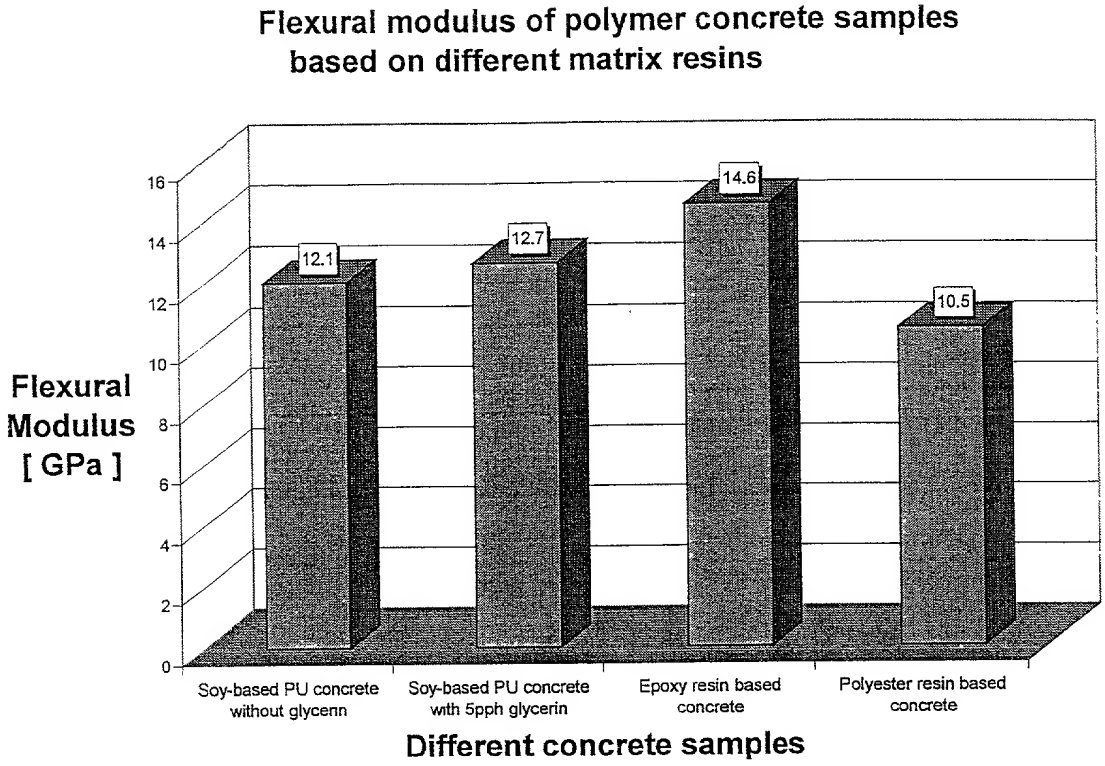

FIG. 29

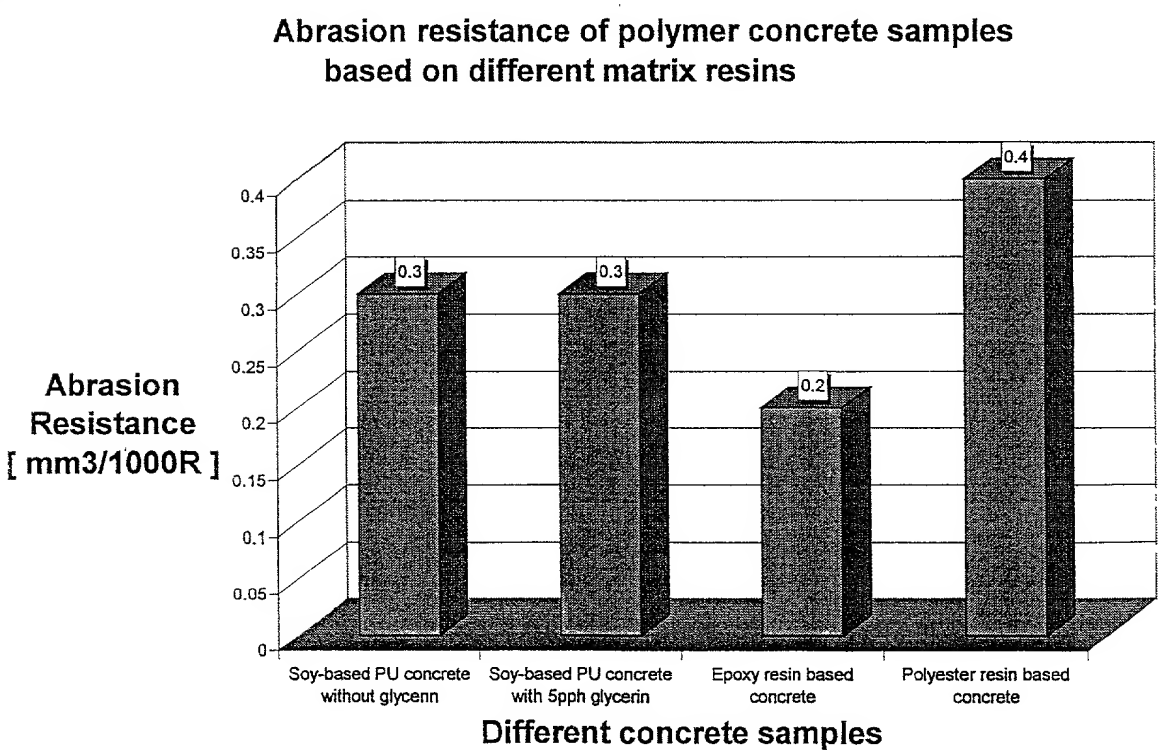

FIG. 30

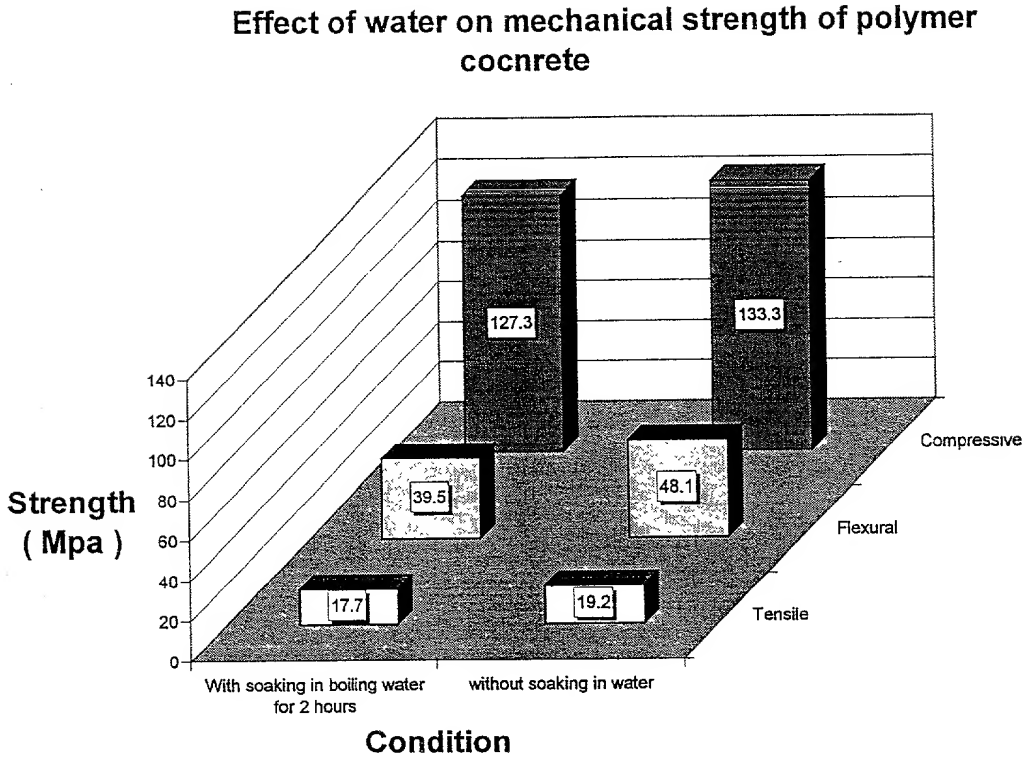

FIG. 31

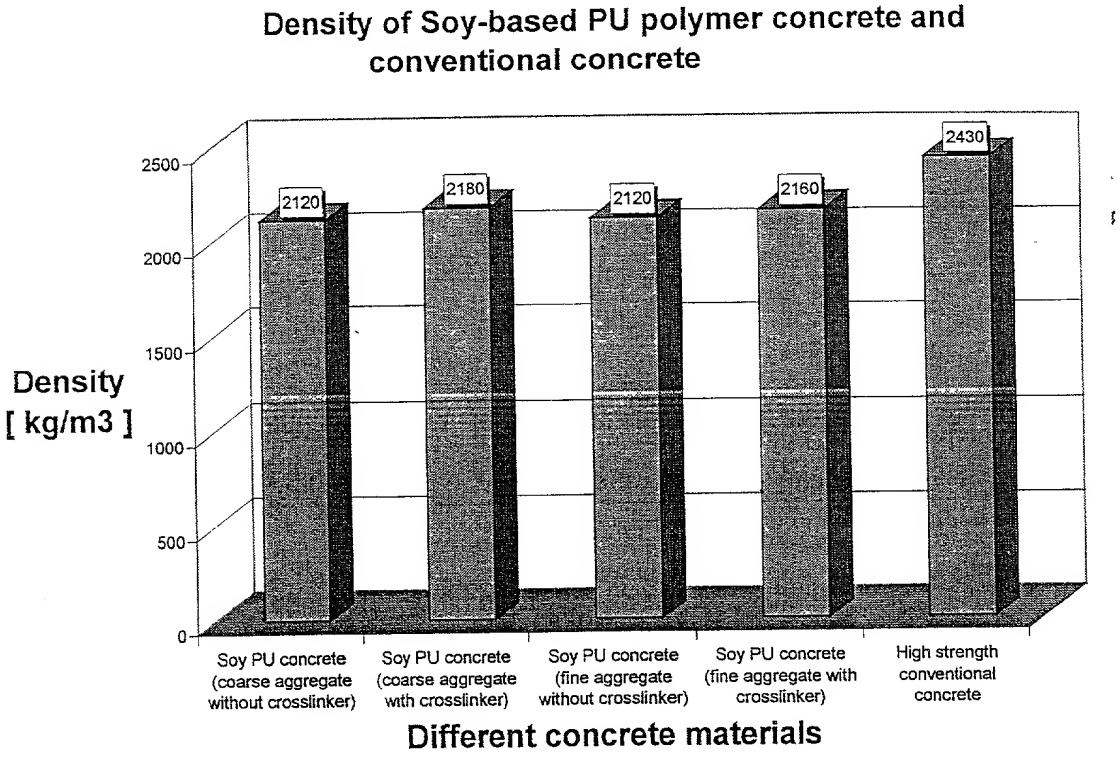

FIG. 32

Splitting tensile strength of Soy-based PU polymer concrete and conventional concrete

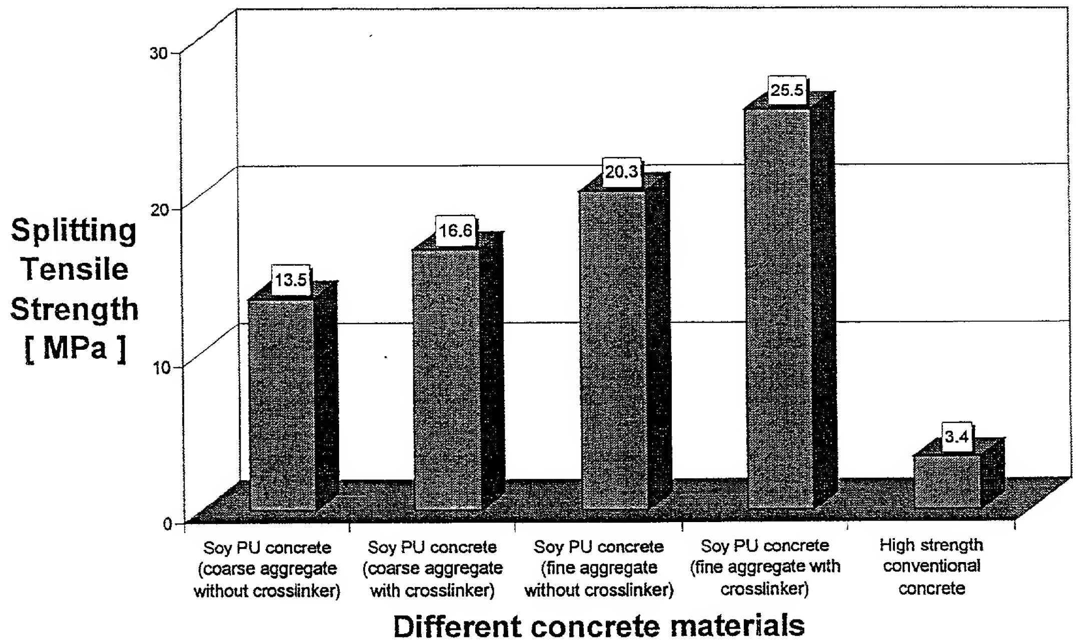
Splitting Tensile Strength [MPa]
30
20
10
0
13.5
16.6
20.3
25.5
3.4
Soy PU concrete (coarse aggregate without crosslinker)
Soy PU concrete (coarse aggregate with crosslinker)
Soy PU concrete (fine aggregate without crosslinker)
Soy PU concrete (fine aggregate with crosslinker)
High strength conventional concrete
Different concrete materials

FIG. 33

Flexural strength of Soy-based PU polymer concrete and conventional concrete

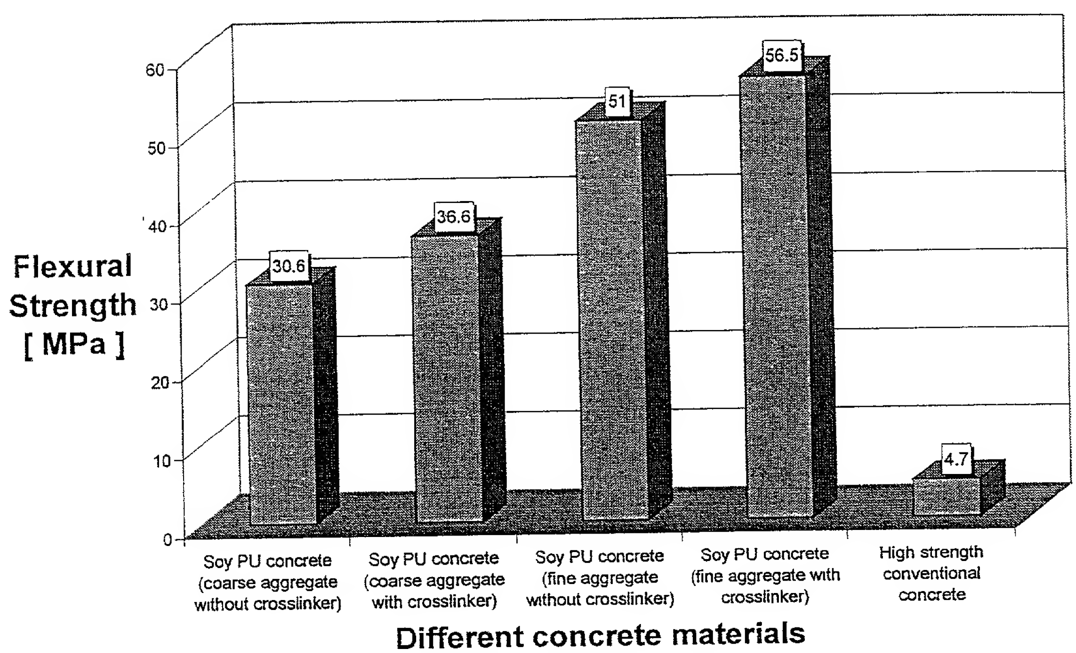
Flexural Strength [MPa]
60
50
40
30
20
10
0
30.6
36.6
51
56.5
4.7
Soy PU concrete (coarse aggregate without crosslinker)
Soy PU concrete (coarse aggregate with crosslinker)
Soy PU concrete (fine aggregate without crosslinker)
Soy PU concrete (fine aggregate with crosslinker)
High strength conventional concrete
Different concrete materials

FIG. 34

Compressive strength of Soy-based PU polymer concrete and conventional concrete

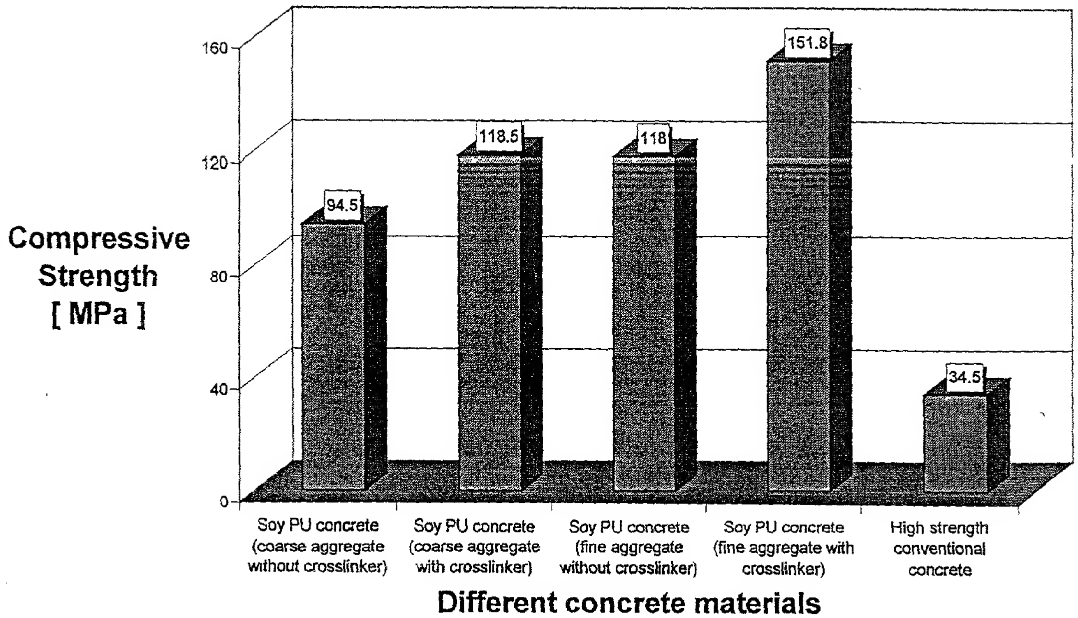
Compressive Strength [MPa]
160
120
80
40
0
94.5
118.5
118
151.8
34.5
Soy PU concrete (coarse aggregate without crosslinker)
Soy PU concrete (coarse aggregate with crosslinker)
Soy PU concrete (fine aggregate without crosslinker)
Soy PU concrete (fine aggregate with crosslinker)
High strength conventional concrete
Different concrete materials

FIG. 35

Abrasion resistance of Soy-based PU polymer concrete and conventional concrete

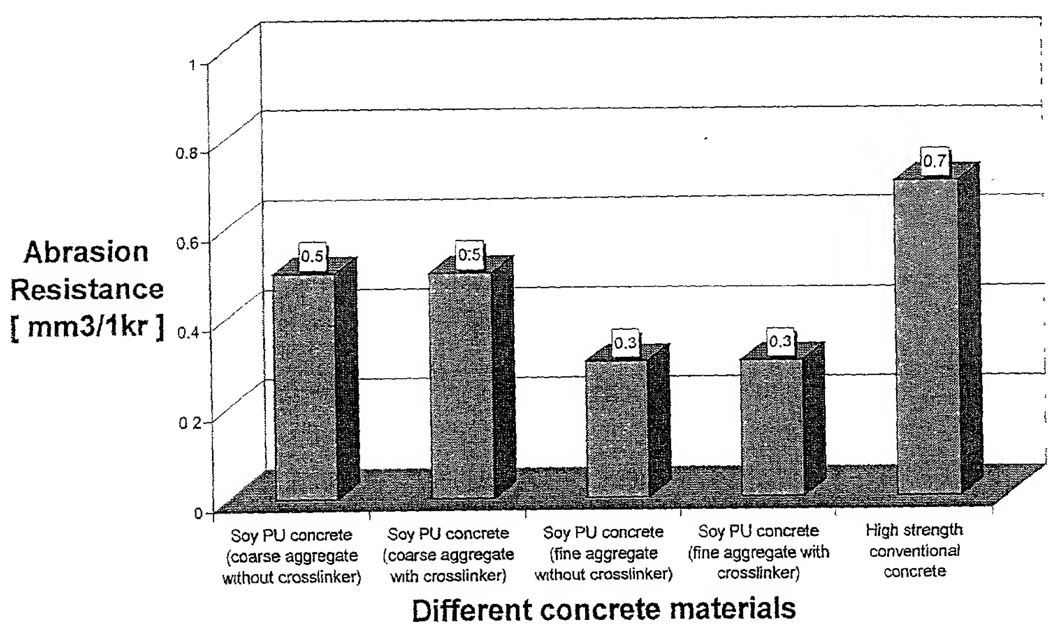
Abrasion Resistance [mm3/1kr]
1
0.8
0.6
0.4
0 2
0
0.5
0.5
0.3
0.3
0.7
Soy PU concrete (coarse aggregate without crosslinker)
Soy PU concrete (coarse aggregate with crosslinker)
Soy PU concrete (fine aggregate without crosslinker)
Soy PU concrete (fine aggregate with crosslinker)
High strength conventional concrete
Different concrete materials

FIG. 36